

## Enthalpy change calculations

1) i) Ammonia can be oxidised to produce nitrogen,  $\text{N}_2$ , and steam as shown in the equation below:



Calculate the energy produced when 50.0 g of ammonia reacts as shown in the equation above.

2)  $\Delta_{\text{f}}H(\text{HBr}, \text{g})$  is  $-36.2 \text{ kJ mol}^{-1}$ . Calculate the heat produced by the formation of 50.0 g of  $\text{HBr}(\text{g})$  from its elements in their standard states.

3) The experimental value for  $\Delta_{\text{f}}H(\text{H}_2\text{O}, \ell)$  is  $-286 \text{ kJ mol}^{-1}$  and the enthalpy of formation of water in the **gas** state,  $\Delta_{\text{f}}H^\circ(\text{H}_2\text{O}, \text{g})$  is  $-241 \text{ kJ mol}^{-1}$ . Using the information, calculate the  $\Delta_{\text{vap}}H(\text{H}_2\text{O})$ , and also the heat required to vaporise 100 g of water.